

CLAIMS

1 A method of releasing energy comprising the steps of providing an electrolyte having a catalyst therein, the catalyst being suitable for initiating transitions of hydrogen and/or deuterium atoms in the electrolyte to a sub-ground energy state, and generating a plasma discharge in the electrolyte.

2 The method of Claim 1 wherein the plasma discharge is generated by applying a voltage across electrodes in the electrolyte.

3 The method of Claim 2 wherein the voltage is applied so as to produce an intermittent plasma discharge.

4 The method of Claim 2 or Claim 3 wherein the applied voltage is in the range 50 to 20000V.

5 The method of any of Claims 2 to 4 wherein the applied voltage is greater than 300V.

6 The method of any of Claims 2 to 5 wherein the applied voltage has a substantially square shaped waveform.

7 The method of any of Claims 2 to 6 wherein the applied voltage has a pulsed waveform having a duty cycle between 0.001 and 0.5.

8 The method of any of Claims 2 to 7 wherein the voltage is switched on and off by a switching assembly comprising an insulated gate bipolar transistor.

9 The method of any of Claims 2 to 8 wherein the applied voltage has a waveform having a frequency of between DC and 100 kHz.

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10 The method of any of Claims 2 to 7 wherein a metal hydride is formed on an electrode which dissociates to form hydrogen and/or deuterium atoms.

11 The method of Claim 10 wherein the metal hydride is formed on an electrode during voltage pulses and subsequently dissociates to form hydrogen and/or deuterium atoms.

12 The method of any of Claims 2 to 11 wherein the current density generated by the applied voltage is 400,000 A/m² or above.

13 The method of any of Claims 2 to 12 comprising the step of feeding the electrolyte past the electrodes.

14 The method of Claim 13 wherein, after the step of feeding the electrolyte past the electrodes, the electrolyte is fed through a heat exchanger.

15 The method of Claim 14 wherein, after the step of feeding the electrolyte through the heat exchanger, it is fed back to the electrodes.

16 The method of any of Claims 2 to 15 further comprising the step of generating a magnetic field in the region of the electrodes.

17 The method of Claim 16 wherein the magnetic field is generated by supplying power to a winding surrounding the electrodes.

18 The method of Claim 17 wherein the frequency of the voltage applied across the winding is in the range from DC to 100MHz.

19 The method of any of Claims 16 to 18 wherein the magnetic field is arranged to cause the plasma discharge generated adjacent the cathode to be spaced therefrom.

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~~20~~ The method of any of Claims 2 to 19 wherein hydrogen and/or deuterium atoms are formed using a first cathode and the voltage applied to generate the plasma discharge is applied across an anode and a second cathode.

21 The method of Claim 20 when dependent on Claim 13 or any claim dependent thereon wherein the second cathode is downstream from the first cathode.

22 The method of any of Claims 2 to 21 wherein a cathode electrode comprises tungsten, zirconium, stainless steel, nickel and/or tantalum.

23 The method of Claim 22 wherein a cathode electrode comprises a sheath of nickel foil wrapped on a substrate of tungsten, zirconium, stainless steel, and/or tantalum.

~~24~~ The method of any of Claims 2 to 23 wherein the anode electrode is formed of a material which is inert with respect to the electrolyte.

25 The method of Claim 24 wherein the anode comprises platinum, palladium and/or rhodium.

~~26~~ The method of any preceding claim wherein the temperature of the plasma is approximately 6000K or above.

27 The method of any preceding claim comprising the step of varying the ratio of catalyst to water in the electrolyte in the range 1 to 20 mMol.

28 The method of any preceding claim wherein the electrolyte comprises water and/or deuterated water and/or deuterium oxide.

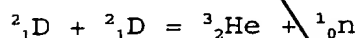
29 The method of Claim 28 wherein the only reactive ingredient consumed by the reaction is water or deuterated water.

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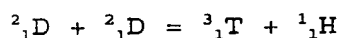
30 The method of Claim 28 or Claim 29 comprising the step of varying the ratio of water to deuterium oxide and/or deuterated water in the electrolyte to control energy generation.

31 The method of any preceding claim comprising the step of heating the electrolyte to a temperature between 40 to 80°C prior to generating the plasma discharge.

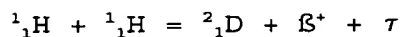
32 The method of any preceding claim wherein fusion occurs via at least one of the following pathways:



or



or



33 Apparatus for carrying out the method of any preceding claim comprising an anode, first and second cathodes, a reaction vessel having an inlet and an outlet, means for feeding an electrolyte through the vessel from its inlet to its outlet, the electrolyte having a catalyst therein suitable for initiating transitions of hydrogen and/or deuterium atoms in the electrolyte to a sub-ground energy state, means for applying a voltage across the anode and the first cathode to form hydrogen and/or deuterium atoms, and means for applying a voltage across the anode and second cathode to generate a plasma discharge in the electrolyte, the second cathode being downstream from the first cathode.

34 Apparatus of Claim 33 including means for converging electrolyte flow towards the second cathode.

35 Apparatus of Claim 34 wherein the converging means is in the form of a funnel or nozzle.

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